Claims

1. A nucleic acid molecule comprising a nucleic acid molecule encoding a (poly)peptide having a function of the human K^+ ion *eag* channel which is

   (a) a nucleic acid molecule comprising a nucleic acid molecule encoding the polypeptide having the amino acid sequence of SEQ ID: No 3 or 4;

   (b) a nucleic acid molecule comprising the nucleic acid molecule having the DNA sequence of SEQ ID: No 13 or 14;

   (c) a nucleic acid molecule hybridizing to the complementary strand of a nucleic acid molecule of (a) or (b); or

   (d) a nucleic acid molecule being degenerate to the sequence of the nucleic acid molecule of (c).

2. A nucleic acid molecule specifically hybridizing to the nucleic acid molecule of claim 1 which comprises the sequence 5'-GGGAGGATGACCATGGCT.

3. The nucleic acid molecule of claim 1 or 2 which is DNA.

4. The nucleic acid molecule of claim 1 or 2 which is RNA.

5. The nucleic acid molecule of any one of claims 1 to 4 encoding a fusion protein.

6. A vector comprising the nucleic acid molecule of any one of claims 1 to 5.

7. The vector of claim 6 which is an expression vector and/or a gene targeting or gene transfer vector.

8. A host transformed with a vector of claim 6 or 7.

9. The host of claim 8 which is a mammalian cell, a fungal cell, a plant cell, an insect cell or a bacterial cell.

10. A method of producing the (poly)peptide encoded by the nucleic acid molecule of any one of claims 1 or 3 to 5 comprising culturing the host of claim 8 or 9 and isolating the produced (poly)peptide.

11. A (poly)peptide encoded by the nucleic acid of any one of claims 1 or 3 to 5 or produced by the method of claim 10.

12. An antibody specifically directed against the (poly)peptide of claim 11.

13. The antibody of claim 12 which is a monoclonal antibody.

14. A pharmaceutical composition comprising the nucleic acid molecule of claim 2, the vector of claim 6, the polypeptide of claim 11 and/or the antibody of claim 12 or 13 and a pharmaceutically acceptable carrier and/or diluent and/or excipient.

15. A diagnostic composition comprising the nucleic acid molecule of any one of claims 1 to 5, the vector of claim 6, the polypeptide of claim 11 and/or the antibody of claim 12 or 13.

16. A method for preventing or treating a disease which is caused by the undesired expression or overexpression of the nucleic acid molecule of any one of claims 1 or 3 to 5, comprising introducing an inhibitor of the expression of the nucleic acid molecule of any one of claims 1 or 3 to 5 or an inhibitor of function of the (poly)peptide of claim 11 into a mammal affected by said disease or being suspected of being susceptible to said disease.

17. A method for preventing or treating a disease which is caused by the malfunction of the (poly)peptide of claim 11 comprising introducing an inhibitor of the expression of the nucleic acid molecule of any one of claims 1 or 3 to 5 or an inhibitor or modifying agent of the malfunction of the (poly)peptide of claim 11 or the nucleic acid molecule of any one of claims 1 or 3 to 5 encoding h*eag* or the

polypeptide of claim 11 having h*eag* activity into a mammal affected by said disease or being suspected of being susceptible to said disease.

18. The method of claim 16 wherein said inhibitor of the expression or overexpression of said nucleic acid molecule is a nucleic acid molecule of claim 2.

19. The method of claim 16 wherein said inhibitor of polypeptide function is the antibody of claim 12 or 13 or a drug, preferably astemizole or terfenadine.

20. The method of any one of claims 16 to 19 further comprising, prior to the introduction step,
   (a) obtaining cells from the mammal infected by said disease and, after said introduction step, wherein said introduction is effected into said cells, and
   (b) reintroducing said cells into said mammal or into a mammal of the same species.

21. The method of any one of claims 16 to 20 wherein said cell is a germ cell, an embryonic cell or an egg cell or a cell derived therefrom.

22. A method of designing a drug for the treatment of a disease which is caused by the undesired expression or overexpression of the nucleic acid molecule of any one of claims 1 and 3 to 5 comprising
   (a) identification of a specific and potent drugs;
   (b) identification of the binding site of said drug by site-directed mutagenesis and chimeric protein studies;
   (c) molecular modeling of both the binding site in the (poly)peptide and the structure of said drug; and
   (c) modifications of the drug to improve its binding specificity for the (poly)peptide.

23. A method of identifying an inhibitor of the expression of the nucleic acid molecule of any one of claims 1 or 3 to 5 or an inhibitor of a function of the (poly)peptide of claim 11 comprising:

(a) testing a compound for the inhibition or reduction of translation wherein said compound is selected from antisense oligonucleotides and/or ribozymes; or

(b) testing a compound for the inhibition of transcription wherein said compound binds to the promoter region of the gene encoding the (poly)peptide of claim 11 and preferably with transcription factor responsive elements thereof; or

(c) testing peptides or antibodies suspected to block the proliferative activity of the (poly)peptide of claim 11 for said blocking activity.

24. The method of claim 22 or 23 wherein said drug or inhibitor is further improved by peptidomimetics or by applying phage-display or combinatorial library techniques.

25. A method of inhibiting cell proliferation comprising applying an inhibitor to expression of the nucleic acid of any one of claims 1 or 3 to 5 or the (poly)peptide of claim 11.

26. A method of prognosing cancer and/or neurodegenerative diseases and/or psoriasis comprising assessing the expression of the nucleic acid molecule of any one of claims 1 and 3 to 5 or assessing the quantitative presence of the polypeptide of claim 11 in cells of a mammal.

27. The method of claim 26, wherein said cancer is mamma carcinoma or neuroblastoma or cervix carcinoma.

28. The method of claim 27, wherein said mamma carcinoma is breast adenocarcinoma, breast carcinoma ductal type.

29. The method of claim 26, wherein said neurodegenerative disease is Alzheimer's disease, Parkinson's disease, lateral amytrophic sclerosis or multiple sclerosis.

30. The method of any one of claims 16 to 21 and 26 to 29 wherein said mammal is a human, rat or mouse.

31. Use of the nucleic acid molecule of any one of claims 1 to 5 in gene therapy.

32. Kit comprising the nucleic acid molecule of claim 2, the vector of claim 6, the polypeptide of claim 11 and/or the antibody of claim 12 or 13.

add Q5